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(54) **Method and apparatus for automatic insertion of a television signal from a remote source.**

(57) A system is provided for inserting selected commercials from a remote source via satellite into pre-cued cable network commerciel breaks at targeted regional groupings of local cable headend operators without storage of the commercials at each headend. By sequencing the avails used for insertion among the groupings of headends, by creating plural levels of simultaneity, and by using compression/decompression techniques, a highly efficient use of the satellite per each transponder channel is achieved despite overlap in breaks as between networks ; while, at the same time, allowing sufficient time during each break for the local headend operator to insert his own local ads if desired, and to use as well, if desired, the decompression capabilities of the system without the need for the headend to invest in its own.

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This invention relates to apparatus and methods for automatically inserting a television signal from a remote source into a plurality of local cable television broadcasts. In particular, but not exclusively, the invention is direction to a method and apparatus for inserting pre-recorded television commercials from a remote central site into local cable television broadcasts in several designated geographic areas.

At present, cable television networks are broadcast over satellite communications. A cable network, such as Cable News Network (CNN), will provide programming, cable network commercials and air time cued by a preceding signal during which the local cable service providers are allowed to insert their own commercial spots. The cable network signal, including the cue tone, is transmitted to the local cable service providers via satellite by transmitting the cable network signal up to a satellite transponder that then transmits the signal back down to the earth's surface over a downlink. The downlink covers a large geographic area. There are usually many local cable service providers in the geographic area of the downlink.

The local cable television service providers receive the signal from the satellite transponder over the downlink. Each of these cable service providers is usually referred to as a cable "headend". In the usual situation a plurality of cable headends are grouped geographically for advertising purposes, and such groupings have become known as Designated Market Areas or DMA's.

Each of these cable headends receives a number of cable network signals such as CNN, the Music Television Channel (MTV), the Sports Network (ESPN) and many others, usually through the use of multiple dedicated satellite dishes. The time made available for insertion of messages may be referred to as "breaks". These breaks need not be used in their entirety. The time used may be referred to as an "avail", and this terminology is adopted for use herein. These "avails" may occur during the networks' commercial "breaks", at a time when a particular network may be running its own commercials capable of being electronically preempted by the insertions, or the network may leave blank air time for the insertions. Typical "avails" are for 30 seconds and there may be two or more "avails" within a "break" which may be of 1 or 2 minutes in duration.

In order to insert advertising into a network cued "break", cable headend operators have employed automation equipment that controls video tape players and positions the "local" spot advertisement(s) or other messages for playback and insertion when cued at the proper time. However, the local headend operator may not be able to fill the entire "break" with economically desirable advertising. Thus a market is created for the headend operator to sell additional, more economically desirable advertising to be inserted. An example of this is a national company's advertisement that is targeted for only regional or semi-regional distribution (e.g. what McDonald's may wish to advertise in New York City, it may not wish to advertise in Dallas, Texas). The "region" to be targeted may often consist of a group of cooperative cable companies who happen to be in a designated marketing area (DMA) or a zone within a DMA.

An advertiser today who wishes to advertise regionally or semi-regionally using the present, most prevalent technology must contact each local cable service headend or a designated advertising representative for a group of headends, arrange for each headend to have a taped copy of the ad, and then make contact with each headend to show the commercial during a desired series of avails over a desired selection of cable channels. This arrangement has been very difficult to establish, coordinate and operate. A national or regional advertiser seeking to reach a target audience in a particular DMA or zone within a DMA will often not undertake the task of entering into such cumbersome arrangements with so many parties. National advertisers have therefore sought out simpler arrangements made directly with network television broadcasters such as NBC, ABC and CBS, or with the cable networks that cover the entire country and are priced accordingly. Both the national advertiser and individual headend operator, in short, suffer due to the inadequacies of the most prevalent technology extant.

A number of attempts in the prior art with non-real time approaches have provided a less than complete solution to the above-described problem. For example:

One known attempt at a solution, called "ADLINK", includes a system for sending to the headend operator in a DMA, from a remote central site, commercial messages over a special satellite transponder in an hour-long stream at off-hours (e.g. nighttime). The headend operators record this stream of commercials on a video tape recorder located at each headend for playback during on-hours "avails" of their choosing (e.g. daytime). This system requires all the tape recorders at all headends to operate reliably over relatively long periods of time. The national advertisers have demonstrated that they do not have confidence that their spots, in fact, are always run by each headend operator in this type of system. In addition, if even one or only a few headends fail in a targeted DMA, monitoring of the lost ad is complex and, when disclosed, it is not always practical to run the ad again free, as there may well be the same or a different headend(s) not working every night. This approach has also been offered by "AdStar" (a/k/a "NuStar" and "Starnet") with more reliable local digital video storage systems replacing the unreliable tape recorders. This newer offering, however, is expensive and requires a large investment by the cable headend operators. Even if these systems work perfectly, with

no loss of commercial, affidavits of performance must still be sent by each headend to the sending source for verification. The paperwork entailed in such a process is cumbersome, expensive, and often creates payment delays.

Another known system which seeks to solve the above problem, uses a single satellite transponder to send a series of promotional messages. These messages may be inserted into the local cable headends programming whenever an "avail" occurs within a "break". Since, however, there is only one message stream and it has to serve all headends all the time, it is not sent in step with the timing of the breaks. Gaps thus inherently occur, except in an unusual or coincidental circumstance. To accomplish its purpose, then, each "avail" is conceived of as being broken up into a continuous stream of ten second messages, so that insertion can occur with some continuity. A third filler message is used to help in the 0-10 second transition period. This approach is known as the "Multiveil" system and is detailed in U. S. Patent No. 4,814,883. It is useful for cable network promotion, but has been shown not to be useful for a regional advertiser that needs full length spots and needs to select specific targeted DMA's.

Another known system used as an insertion approach recognizes that all cable networks do not run commercial breaks at the same time. This automated approach located at each headend uses a computer programmed to draw upon a pool of headend tape players as needed to complete the insertion. The video tapes contain many commercials which are laid down in a special format. Each tape player is positioned by the computer to start at the format location of the next desired commercial. This concept is known as the "ARVIS" system and is detailed in U. S. Patent No. 4,724,491. A known extension of this approach calls for commercials to be sent over a fiber optic link by the headend operator with the computerized video tape bank, to an adjacent cable operator for insertion in its programming in order to widen the audience for the local advertising. This concept has been used, for example, in Indianapolis by two cable operators wishing to connect their systems together just for the brief duration of the commercial breaks.

In view of the above, it is apparent that there exists a need in the art for both an apparatus and method which may be used efficiently and economically to insert and verify the insertion of commercials, or other messages, into slots cued by cable networks during their programming for insertion of messages from another source, particularly where it is desirable to use at least a portion of the available time for regional advertising in a plurality of designated market areas, or zones within these DMA's.

In a preferred embodiment, a system is provided which fulfils the above-described need in the art, as well as other needs apparent to the skilled artisan and includes an apparatus for inserting a television signal (e.g. commercial) in time sequence from a remote source into ongoing television programming being received by at least two designated areas, each area comprising at least one cable headend. The apparatus which may be located at the remote source includes means for sensing one or a plurality of cue signals associated with the television programming, each of which designates an upcoming time interval within which the signal from the remote source may be inserted, means responsive to the cue signals for sending an additional television insertion signal from the remote source to a first designated area to be inserted into a time interval; and means for sending the same or different insertion signal to a second of the designated areas after completion of the insertion signal at the first designated market area. Each insertion signal may be one-half or less of the time interval into which it is inserted.

The envisioned apparatus may include means for inserting the signal, e.g. commercial(s), via a satellite communications network or over fiber optic communications link or microwave landlink. In this respect, in certain preferred embodiments, the apparatus further includes switch means located at the cable headends for inserting the remote source signal into the ongoing television programming to subscribers within the designated market areas. These switch means may also include means for allowing the local cable headend operator to coordinate the insertion of local programming with the insertion of the remote source signal. In certain embodiments, where the remote source signal is compressed for transmission and then decompressed at the headend, the headend switching means allows the local headend operator to use the decompression system to decompress his own compressed local programming if desired.

Also envisioned for solving the above-described and other apparent needs in the art, is a method for inserting a signal (e.g. a television commercial) in time sequence from a remote source into ongoing television programming being received by at least two designated areas, each area comprising at least one cable headend. The method preferably includes monitoring the television programming at the remote source and sensing at this location one or a plurality of cue signals associated with the television programming which designate forthcoming time intervals within which a signal from the remote source may be inserted, sending in response to a cue signal, an additional television insertion signal from the remote source to a first designated area, and, upon completion of the running of the insertion signal in the first designated area, sending the same or different insertion signal to be inserted into the same or a different time interval by a headend at a second designated area. In certain embodiments the inserted signals are commercials and run for about one-half or less of the

time intervel into which they ere inserted.

The term "insertion signal" as used herein is used in its broadest sense to mean any kind of message or instruction to be inserted in the ongoing programming. In the preferred embodiments, of course, the insertion signal is e commercial. In this respect, the term "commercial" is used hereln in its broadest sense, as well, to designate generally the insertion of any promotional or instructional message. Such a message may take many forms, including such things es actual free enterprise, corporate advertisements (Pepsi, Coke, etc.), public service ennouncements, network "promos", end the like. Obviously, widest-spread utility is found in the field of corporate advertising and, as such, this constitutes the preferred type of "commercial".

In certain preferred embodiments there is no storage of the commercial messege et the cable headends. This is accomplished at the central remote site. In certain of these preferred embodiments, furthermore, the commercials to be inserted ere transmitted from a single remote central site (such as Denver for the USA) over en uplink beam to a satellite transponder. In other embodiments fiber optics could be used. The commercials are then broadcast over the satellite transponder downlink beam to cable systems in a number of separate downlink DMA's sequentially. In this way, e way is provided of inserting commerciel edvertising, or other messages, on cable TV networks from a central site by preempting the ongoing programming at selected remote cable headends in different areas.

In preferred embodiments a number of techniques are used to minimize the cost of the trensponder system. For exemple, the trensponder is preferably time shared among a number of geographic areas, such as New York, Washington and Chicago. Each downlink area, or Designated Market Area (DMA), is teken in e time sequence in turn. By sharing the downlink over time emong e number of DMA's (or e number of differently grouped heedends within e DMA, herein at times referred to as "zones") the downlink resource is used more efficiently. In one embodiment, for example, eech downlink zone or DMA consumes ebout one-helf or less of each "breek", leeving the remainder for network commercials or for local eds to be inserted by the local headend cable operator (thus creating what may be referred to as e "local evail"). Then, each DMA (or zone) consumes only that fraction of the avails of which it is of the total DMA's designated to be used for insertion by the central site. For exemple, if four DMA's (or zones) are designated for insertion by an uplink beam from the remote source, each DMA's Insert (i.e. "avail") will consume one-fourth of the total avails to be used for insertion in the sequence from the ramote source. By time shering of e setellite transponder using such a sequencing technique, multiple (e.g. four) DMA's mey be accommodeted end the use of the transponder resource is reduced, elong with its attendant cost. In eddition, of course, local insertions during e "local evail" then become available by simply making the remote "avail" about one-half or less of the total network "breek". In one embodiment of sequencing, for example, the remote site system sends out a commercial to be inserted in a four "avail" sequence during two sequential "breaks", to four sequential DMA's, with one DMA following the next in a cycle that repeats every four commercial "avails". Since the "avail" is not the full "break", local ads may be inserted or the network's national ad ellowed to run, in the remaining time.

Flexibility and efficiency are also achieved through a second concept called "simultaneity", by recognizing that commercial "breaks" do not occur all at the seme time on ell networks. In the preferred embodiments, then, simultaneity is built into the system. The central site, in this respect, sends the first insert commercial to occur on a given network (e.g. CNN) over e first transponder channel end directs this for insertion. This is called the first level of simultaneity. A second commercial is then inserted "simultaneously" (i.e. at least overlappingly in time) using another transponder channel, into another network (e.g. MTV) while the first commercial is still playing on CNN. This is called the second level of simultaneity. Upon completion of the first commercial on CNN, or first level of simultaneity, the first transponder channel is made aveilable for another commercial to be inserted on yet another network (e.g. ESPN). In one embodiment, four insertion transponder channels are shared to insert commercials into eight cable networks in this menner. As will be explained below, edditional levels of simulteneity above two, may be achieved and are contemplated. Additional simultaneity, of course, achieves the ability to insert simultaneous commercials into more than two network "breeks".

A third concept for achieving still additional efficiency includes the use of known video compression technology so that several audio/video chennels can be created from a single transponder channel. Video compression takes advantage of the redundancy in a TV picture. The signal is digitized end computations run et high speed take out some redundent information. When the redundant information is removed, the video is said to be compressed. In one embodiment for example, video compression of four times (i.e. 4:1 ratio) et the central site and decompression of four times at each headend site is used as e means to further conserve the transponder resource on the setellite.

In the particularly praferred embodiments, when all three of these efficiency creeting concepts ere implemented together, the use of a single transponder becomes highly efficient. For exemple, in the instance where there are four DMA's or zones in an in-

sertion sequence (i.e. 4:1 sequence), when there is e 2:1 level of simultaneity (i.e. number of networks to number of levels of simultaneity) and a 4:1 compression ratio employed, the "efficiency ratio" of a transponder channel is 32:1. That is to say, for example, a single trensponder chennel now has the capability of being used as 32 audio/video channels for inserting commercials which can be deployed into 8 networks in four sequential DMA's or zones. It is to be understood, of course, that this precise example is not limiting. In this respect, eight DMA's may be serviced by using e compression ratio of 8:1. The "efficiency ratio" would then be 64 because the insertion sequence remains 4:1 because servicing of the eight DMA's is in two groups of four DMA's.

This invention will now be described in reference to certain illustrated embodiments wherein:

IN THE DRAWINGS

Figure 1 is a diagrammatic illustration of a satellite communication system in accordance with this invention;

Figure 2 is a diagram illustrating a basic television commercial insertion system as contemplated in an embodiment of this invention having video compression for the uplink signel and video decompression and control switching in the cable system;

Figure 3 is a diagram showing the time orientation of commercials to be inserted into available time slots for designated market areas according to en embodiment of this Invention;

Figure 4 is a diagram illustrating an embodiment of e signal processing and switching configuration at a cable headend site according to this invention;

Figure 5 is a diagram illustrating a configuration of e central remote site for broadcasting tha streem of commerciel insertion signels according to en embodiment of this invention;

Figure 6 is e diagrem illustreting another signal processing and switching configuration at a cable heedend site according to this invention;

Figure 7 is a diagram showing a time oriented insertion scheme es contemplated by this invention; and

Figure 8 is a diagram showing another time oriented insertion scheme es contemplated by this invention.

With reference to Figure 1, the embodiment illustrated is e cable television commerciel insertion system which receives e cuing signal from e cable network, such as CNN (not shown), and, in response to that cuing signal, transmits a composite signel 2, which includes a commercial insert signal 2a, end a control signel 2b, from e remote erbitrary central site 1. The commercial signal 2 to be inserted is broadcast over an uplink beam 3 via e standard setellite dish errangement 95 to a multichannel setellite transponder 10. The satellite transponder 10 receives tha uplink signals 3 and then broadcasts downlink signals 11 (uplink and downlink signals are in RF frequencies, standerd in the industry).

The downlink signals 11 sent from satellite transponder 10 are grouped by coding into designated market areas (DMA's) or zones 12, 14, 16 and 18. Preferably, these DMA's or zones are geographically separated, although they need not be. Within each DMA there may be a plurality of cable headend downlink receiver switching sites (i.e. local cable company operators) designated generally as 22. Each headend site 22 receives its signals via multiple dedicated dishes generally illustrated as item 250 (illustrated schematically as a single dish for convenience). Each of these cable headend receiving systems 22 then provides the television signals for a local cable television system sent to TV cable customers.

With reference now to Figure 2, there is first illustrated a commercial insert uplink signal sourca at central site 1 for generating RF frequency beam 3 in response to a number of received network television signals. These network program signals (RF signals) are received by multiple dedicated dish arrangement 93 (illustrated schematically as a single dish for convenience) in the form of RF signals 242, 244, 246, and 248 etc., totaling eight network signels in ell. (It is understood, of course, thet eight networks are merely exemplary. More or less networks may be serviced than eight, and such other numbers are contemplated for use in this invention.) Alternatively, these signals may be received from a fiber optic feed or microwave lendlink, not shown. These network program signals received in RF frequency form are sent through conventional satellite signal receiver 91A which converts the RF frequency to tha audio/video spectrum. The audio/video spectrum signals emerging ere signals 50, 52, 54, 56, 58, 60 and 62.

The signals so received and converted into signals 50, 52, 54, 56, 58, 60 and 62 usually include nationally broadcast cable network programming, including their cuing signal for signalling an upcoming commercial "breek". Such cuing signals usually appear as en audible or sub-audible tone in the ongoing programming. Examples of such cable network programming are: Cable News Network (CNN), ESPN, the Music Television Channel (MTV), Discovery Channel, Arts and Entertainment Channel (A&E), Nostalgia Channel (NOST), the USA Channel (USA), the Femily Chennel (FAM), TNT, end others. These video/audio spectrum signals are fed, in groups of four or more, into network insertion systems 70 and 72.

In response to the "break" cuing signals, the commercial insertion system 70 and 72 provides a commercial insert signal to uplink 3 from the first adver-

tising signel encoder/compressor 74, the second advertising signal encoder/compressor 76, the third advertising signal encoder/compressor 78, end the fourth advertising signal encoder/compressor 80. The signels for each of the encoder/compressors (i.e. the commerciels to be inserted) end their respective coded control now compressed, are fed into a compressed video signal generator (i.e. an RF up converter) 90 of known type for transmission over uplink beam 3 to satellite transponder 10.

An encoder/compression system useful in the practice of this invention is e four chennel TDM encoder system (4 video, 16 eudio) manufectured by Scientific-Atlanta, tnc., Attanta, Georgia. Such e system generally includes as the 16 channel audio system, a D9160 SEDAT Audio Encoder Chassis, D9165 Dual SEDAT Audio Encoder Cards, en appropriate computer software, es well es for the four chennel video system, a D9101 single channel video encoder including an NTSC/CCIR 601 decoder/synchronizer, a D9100 multiplexer (21.5 Mbps) and a D9170 QPSK modulator (43 Mbps). There may also be provided a four chennel monitoring system which includes a D9410 TDM receiver, a D9460 multi-decoder mainframe end a D9465 decoder module (21.5 Mbps). This can be used, as hereinafter described, to monitor the uplink signal being sent out for insertion.

It may elso be helpful to emptoy e cold standby system with a 1:4 redundancy. Each 1:4 redundent system may include the appropriate number of units as in the first described unit, which may also include a 418 RF protection switch and a DEQ7-Yamaha audio delay unit, end e protection routing switcher. As used in the description of these elements, "encoder" includes the compression system, as well es the coding system; while "decoder" includes decompression es well as decoding.

The satellite transponder 10 sends the commercial insert signels and coded control instructions over downlink beam 11 to e plurelity of cable system heedends 22 (only one shown for convenlence) In a particular downlink area or DMA (e.g. DMA 12, 14, 16, or 18; Fig. 1). It is, of course, understood in this respect, that an entire DMA need not be targeted, but that a particuler DMA, for example, may be segregeted into multiple "zones" for tergeting. The commerciel insert signals end coded control instructions are received (i.e. converted to the audio/video spectrum) and decompressed using decompression/receivers 100, 102, 104 and 108, such as an "Integrated Receiver/Decoder" Model 9708 distributed by Scientific-Atlenta, tnc..

An alternetive to the use of decompression/receivers 100-106 is shown in dotted tine form in Figure 2. tn this alternative embodiment, a series of decompression/receivers generelly indicated by the box 500 which is constructed in e similer feshion to decompression/receivers 100-106 in thet it hes the same capebilities, but further includes internal modem capabilities so as to eliminate the need for modems 252B and 252C (used in the full line embodiment to provide the serial control signals to audio/video switches 108 and 110), ere constructed so as to allow the tocal heedend ceble compeny to use the decompression capabilities of receiver 500 (usually supplied by the central site 1 owner) rather than having to invest in its own decompression system. tn this dotted line embodiment, the local headend operator is provided with a combined receiver/modem/control unit 502 for controlling the insertion of his own compressed tocal video/audio messages 504. Unit 502 can be controlled by the local operator, or in enother embodiment can be controlled via signal 11 from remote central site 1. tn either embodiment, the headend operator may use compressed audio/video messages in his own local messege bank 504 without having to employ a separate decompressor unit of his own.

Returning now to the full line first embodiment illustrated in Figure 2, the aforesaid decoder system in elements 100-106, such as the previously referenced Modet D9708 distributed by Scientific-Atlante, Inc., may be of the same type of decoder system located at the remote site 1 as part of the encoder system as described ebove and used in its monitoring system (hereinafter described) including the parts as described for a four channel TDM decoder system (21.5 Mbps; 4 video., 16 eudio) as listed. Downlink receiver 91B receives the network signals from the dedicated multidish errangement 250 in RF frequency form and converts such signals into usable audio/video signals 50, 52, 54, 56, 58, 60, 62 and 64. Leading then into audio/video switches 108 end 110 are these aforesaid network signels, the serial control signals coming from modems 252B end 252C (e.g. Hayes-compatible modems), as well as the now decompressed commercial signals being sent for insertion as shown by the arrows emerging from the bottom of decompression/receivers 100, 102, 104, and 108. tn this way, cable chennel signels 50-64 can be viewed by cabte tetevision viewers and, upon receiving the coded control messages from the decompression/receiver devices 100, 102, 104, and 106 (and the central signals from modems 252B and/or 252C), the audio/video switches 108 end 110 will switch in the commercial insert signals so thet the commercial insert signals that have been sent from remote central site 1 are played over the tocal cable channels on lines 120, 122, 124, 126, 128, 130, 132, and 134 that are going to the TV cable customers. This errangement thus results in eny given cable chennel signal heving a remotely cued and broadcast commerciat inserted, in real time, from a central uplink site 1 during e commercial "break" es cued by prior tone received from a given cabte network signal (e.g. 242, 244, 246, 248, etc.).

A significant edventage of this embodiment is

thet the expensive communications resource (i.e. the satellite and its transponders) is conserved and used to maximum effect at minimum cost. In this respect, efficiency is achieved through the recognition that the commercials to be inserted into a cable television signal by way of e "avail" during e commerciel "break" can be time shared among e number of DMA regions or zones within a DMA.

In this respect, and as shown schematically in Figure 1, the satellite transponder 10 can downlink a coded commercial insert signal 2, useful in only certain erees. These erees may be DMA's themselves, or may be zones within a given DMA. For illustrative purposes, area 12 shall be designated as area "A" (Atlanta, Georgia). Area 14 shall be designated as area "B" (Boston, Mass.). Area 16 shall be designated area "C" (Chicago, Ill.), and area 18 shall be designated eree "D" (Dellas, Texes). Thus, for example, each of these downlink DMA's or zones can be a separate, major metropolitan aree if desired. With the system it is possible to selectively downlink a commercial insertion signel into each one of the four DMA areas or zones using an efficient sequencing concept.

With reference now to Figure 3, there is illustrated an embodiment of this time sharing (i.e. sequencing) concept. The block of time denoted by 222 is the full network (e.g. ESPN) "break" time allotted for insertions. The signal insertion is denoted es 212 end runs for the length of time 220. This is known es an "eveil" in area A (Atlanta). Since an actuel insertion 212 is taking place by way of receipt of a commercial from remote site 1 into area A, then this block of time 220 is termed an "avail". During that avail time, the other ereas B-D will show some other commercial (either a local commerciel, thus designated es e "local evail", or the commercial which the cable network is sending). In this instance, end in most situations contemplated, the time span 220 is shown as running about one-half or less of the entire "break" 222. The next sequentiel "avail" is for eree B (e.g. Boston) end shows the insertion of the same or e different commercial by way of insert 214. The two blocks together consume substantially the entire amount of "break" 222. Of course, it is understood that when the insertion is taking plece in area B, areas A, es well as C (e.g. Chicago) end D (e.g. Dellas) ere free to run local ads by way of a "local avail" or allow the network ed to run.

Since evails A/B have consumed the entire "break" 222, cable network programming resumes thereafter and e new "avail" only occurs et the next designated "break". As shown, this next "break" is then consumed by two more "avail" insertions sequentially sent respectively to ereas C and D (the commercials sent may be the same or different) end represented as insertions 216 and 218, respectively. As eech insertion takes plece in e given eree (i.e. C or D) the other areas are freed up for local insertion or continued cable network commerciels es eforeseid.

Following the second "break" and further resumption of network programming, the next "break" merely restarts the cycle again as among areas A, B, C, end D. In this way, es between four designeted areas (DMA's or zones) each designeted area only consumes one-fourth of the entire "avail" time being consumed in any given market area, freeing the rest of the time for local or network ads. It is to be understood that en "avail" may, in certain circumstances, consume en entire "break". Thus, sequencing of area "avails" actually results in the sequencing of entire area "breaks" in such a situation.

A typical example of a length of time for an entire "break" made available for second source insertion of commercials by the cable network compeny is 1-2 minutes. Typically the "eveils", whether used by the remote source or by the local cable operator (headend), are for approximately 30 seconds in duration. It is, of course, understood in this respect that Figure 3 illustrates the "breaks" being provided by a single network, here ESPN The coordination of insertions into other network breaks is described below. It is elso understood that spacing between the breaks is not necessarily the same, and, as especially occurs at times with ESPN, they may occur somewhat randomly, particularly during a sporting event such as baseball.

With reference now to Figure 4, the switching means at each cable heedend 22 are more precisely, but still schematically illustrated. In this respect, and with brief reference to Figures 2 and 4 together, it is to be pointed out thet receivers 91A end 91B are e bank of conventional receivers end cue tone detectors of known design (e.g. which not only detect the cue tone, but convert RF frequency to the usable video/audio spectrum. In eddition, and with specific reference to Figure 2, unit 90 is an RF up-converter of conventional design which, of course, creetes from an audio/video spectrum signal an RF frequency beam for sending to the transponder in satellite 10.

Turning now to the schematic drawing of cable headend 22 as illustrated in Figure 4, it can be seen that a number of signals (here nine, including signal 11) are being sent vie various downlinks to e multiple array of standard dedicated dishes 250. Among these signals, of course, is the insertion signal 11, and the cable network signals 242, 244, 246, 248, etc., which are received in the downlink receiving satellite dish array 250. Signal 11 is the composite commercial insert signel (ectuelly e stream of multiple commerciels coming with coded instructions), of course, from the remote cantral site 1. Network signals 242, 244, 246, 248, etc. are, as described above, the regular cable network signals (CNN, ESPN, etc.) being received by both dish erray 250 located et heedend 22 and dish erray 93 located at remote site 1 (Fig. 2). These net-

work signels mey be coming from the same or different satellites (not shown).

As shown now in Figure 4, signal paths 258 end 260 carry the same commercial insert signal 11 being sent separately to signal decompression/RF conversion receivers 100 and 102. Receivers 100 end 102 are set to produce a first level of simultaneity (i.e. en audio/video commercial insert signal along path 262) and a second level of simultaneity (i.e. commercial insert video/audio signal 264). Signal path 262 transmits the first commercial message in the stream to run, end signel peth 264 trensmits the second commercial In the stream to run seperately, simultaneously or in overlapplng fashion (or vice versa). When the first commercial is complete, signal path 262 is freed up to transmit another commercial insertion (e.g. to another or the same network). Signal path 262 is thus eptly termed es the "first level of simultaneity" end signal path 264 is aptly called the "second level of simultaneity" because each may be inserted simultaneously into two different networks if desired. Two levels of simultaneity are used herein for four networks. Additional levels of simultaneity may be edded with larger groupings ot cable networks end switches.

Composite signal 11 includes, es aforesaid, a serial coded central message 270 for controlling switches 284 end 286 which insert into network signals 50-56 the commercials at the appropriate time. As further illustreted in Figure 4, downlink composite signal 11 efter its conversion in receiver 100, is sent to a conventional low speed (4800 baud) modem 252B (a Hayes-compatible modem) which then controls the audio/visual switches 284 and 286 (all as shown in Figure 2 in combined form as switch 108) end thus the insertion process. Cable setellite network signals 242, 244, 246, and 248 are recaived in the bank of receivers end cue tone detectors 91B (as eforesaid) and emerge as audio/video signals 50, 52, 54, and 56. Also emerging for sending to a similar bank of switches 110 ere eudio/video slgnels 58-64 which are, of course, the other four RF network signals (not numbered) which heve come in to dish system 250. In this respect, then, the switching mechanism 108 and 110 will be handling for insertion eight network programmings. In response to coded control messege 270, the eudio/video switches 284 end 286 switch from the cable television signals 50, 52, 54, end 56 to one of the commercial insert signal palhs 262 or 264. A similar function is duplicated, of course, in switch means 110 es illustrated in Figure 2. This switching is eccomplished and the resultant signal is output on customer cable lines 120, 122, 124, end 126 (and for switch 110, lines 128-134). Additlonal advertising signels to be inserted may be eccommodated as future growth dictates on a line such as shown as 260. Additional broadcast signals can then be switched for commerciel insertion es shown in the redundant switch circuit 290. In this way, the cable headend configuration can be flexibly configured for future growth.

With reference now to Figure 5, there is illustrated an embodiment of insertion means 70 or 72 and its interrelationship with elements 74-80, up-converter 90, and decompressor/receivers 100-106 es more generally illustrated in Figure 2. In this respect, end for reference purposes, it is here understood that central site 1 produces uplink signal 3 (see Flgs. 1-2) which includes the stream of commercials to be inserted. Signal 11, of course, is the transponded signal 3. At remote cenlral site 1, the same cable satellite network signals ere received es et headend 22 via dish systems 93 and 250, respectively. After pessing through conventional cable receivers 91A and 91B (site 1 end 22, respectively) they become a audio/video network signals 50-64. In this embodiment, elements 74, 76, 78, end 80 ere individuelly dedicated to link only with their respective decompressor/ receivers 100-106 at the headend, such that 74 is linked only to 100, 76 to 102, etc.. With reference to Figure 5, signals 50-56 are received by insertion means 70, while signals 58-64 are received by insertion means 72.

The audio signals are monitored for Industry standard cue tones which indicate the beginning of a cable commercial break (usually 5-8 seconds before the ectual commercial break occurs). These cue tones, furthermore, in some networks may be stenderd sub-eudio tones. A computer controller 340 detects the audio or sub-audio cue tones and provides a control slgnal 344 to control (via appropriete software) the switches and tape players 310a-h for commercial insertion system generally indicated es 360. Within computer/controller 340, whenever sub-audio tones are to be detected, there is provided e sub-audio tone detector such as a Wegener Model 1601 mainframe and control, for converting sub-audio tones to usable audio tones.

Signals 50, 52, 54 and 56 are also routed as video signels only to the tape players 310a-h for network synchronization, which are first input to video input synchronization system 308 (a set of relays coordinating network signals with tape decks 310a-h). This synchronization system 308, of known design, puts the video tape players 310a-h and, therefore, all of the stream of commerciels to be inserted, "in synch" with the desired network so thet the TV plcture will not eppear to roll when commerclals are inserted.

The video synchronization system 308 provides an output signal which controls these video tape players 310a-h (which may be Sony VP7000's). An alternetive to the use of video tape pleyers 310e-h is to use a known digital storage and playback device. When tape decks are used they are prefereblу of one hour in length to contain 30-second commercials with 2-second gaps in between. Thus each tape may contain e little more then 100 individual commerciels for insertion. Video tape players 310a-h (or alternative

digital storage and pleybeck device) In this wey are capable of putling out a plurality of commercial signals in a slream, for Insertion as controlled by eudio/video coordination switch system 314. The output of the eudio/video switch system 314 creates a level 1 simultaneity signal 316 and a levet 2 slmultaneity signal 318. Signal 316 and signal 318 are input to audio/video switches 320 end 322 (e.g. ARVIS 7742S switches) end are elso used to drive compression/ encoding systems 74 and 76. An exemple of a unit which includes elements 340, 344, 308, 314, as well as the monitoring system 320/322 (hereinefter described) is an ARVIS 7240 purchasable from the ARVIS Corporation. Compression systems 74 and 76 feed the signals so received, as well as the signal received from modem 252A into up-converter 90 which, via uplink dish 95 (Figure 2) then creates composite commercial stream signel 3 to setellite trensponder 10. It is understood, of course, that insertion device 72 is a duplicate of 70, and, as shown in perentheses handles signals 316' and 318' for insertions into network signals 58-64.

In eddition to sending the converted network signals 50-64 through the switch mechanism as previously described, insertion mechanism 70 and 72 also include means for monitoring the uplink signal being sent for eccuracy. For this purpose switch means 320 and 322 are provided so as to generate a monitoring system. In this respect, switches 320, 322 provide output signals 356 end 358, respectively, to video end audio monitors for purposes of monitoring for quality and accuracy the insertion taking place et the uplink site.

With reference now to Figure 6, there is illustrated enother embodiment of a switching metrix for creating the insertion of commercials. In this embodiment switch means 108, 110 (Fig. 2) are combined into a single switching matrix. In the embodiment as illustrated in Figure 4, in this respect, the separate switch matrix 108 end 110 eccommodate, in eech, two levels of simultaneity. Thus, each switch matrix 108 or 110 can eccommodate only two commercials et one time, on four networks. In the embodlment of Figure 6, on the other hand, where matrixes 108 and 110 are combined, four channels may be accommodated for overlepping commerciel breaks on eight networks. This later embodiment is thus statistically more efficient and should be used wherever demand so justifles.

In order to achieve this increased efficiency, and with specific reference to Figure 8, the number of tepe pleyers has been increased from eight to sixteen, end now includes tepe players 310a-p. As can be seen, the system is generally the same as thet illustrated end described above with respect to Figure 5, except that switch 314 now outputs four levels of simultaneity 316, 317, 318, end 319, which ere elso used to drive elements 74, 76, 78 and 80. The output monitoring switch 321 is en expanded matrix switch that inserts four levels of simultaneity into all eight cable networks and creates monitoring signals 357. Monitoring may also be accomplished, if desired, by locating at the remote sile 1 (or at any monitoring site) another system 22 (i.e. a monitoring headend). By using both monitoring systems, both the uplink signal and customer signal are monitored. Further expansion to sixteen, or more, networks may be made in a similar fashion by merely reconstructing further additional mechanisms in the same way that Figure 6 increases over Figure 5.

Another unique feature of this system, due to its real time nature that allows for monitoring at any site merely by creating another downlink system 22 that monitors all areas being serviced, is that the need for numerous affidavits of performance may be eliminated. This is eccomplished by merely esteblishing es the monitoring site 22 an independent verification service such as A. C. Nielsen Corp. (a division of Dunn & Bradstreet Corp.) which then need provide only a single verification of performance to the required parties if requested.

From the above, it can be seen that for the first time there is provided a very efficient and unique method and apparatus for inserting the same or differenl commercials into different areas. At a central site 1, the cable network signals are monitored for tones which signal the breeks, so that inserted commercials can create "avails" therefrom. Upon detection of the cues for the breaks, avails may be simply and efficiently created at the remote site in which commercials may be inserted by efficient use of a satellite transponder 10. All of this can be done without interfering with lhe ebility of the local cable operetor to insert where desired local advertising which he hes been able lo obtain to help support his local cable company.

With reference, in this respect, to the uplink signal 3, there is included therein en eddressable coded control message and e plurality of commercials in a stream to be inserted. The switches at each headend contain an eddressing feature, so that they only respond to commands with their address when received. The commercials are time shared, then, in sequencing fashion among e plurelity of designeted merket areas or zones (or other form of different designee), such es those es illustrated in Figure 1. Each of the cable headend units 22 in a given designated DMA or zone within e DMA, receive its designated commercial insert signal. The commercials ere time shared such thet only one of the designeted erees shows the inserted commerciel at a time on any particular network. In this way, the trensponder resource 10 is conserved and, as hereinbefore described, one transponder can be used to serve a plurality of DMA's or zones.

For example, one market area or zone is chosen

for receiving a specific commercial insert signal. That designated area and the cable headend units within it will then receive the coded control message to control audio/video switches 284, 286, Figure 4 (also shown as 108 in Figure 2) at each headend. The audio/video switches are switched to allow signals 316-319 (or 316, 318, 316', 318' in Fig. 5) to be inserted in real time into the local cable system during the chosen "avail" for each cable network. The commercial chosen need not be the same for each avail or each sequence, since through control means 344 and the bank of tapes containing numerous commercials, commercials may be selected from each tape and/or from each tape deck 310a-p for insertion in the appropriate fashion.

The permutations and combinations are numerous, all of which are contemplated by this invention. However, in order to demonstrate both the efficiency and uniqueness of the subject invention, there is presented in Figures 7 and 8 an illustration of two sequencing embodiments. With reference first to Figure 7 there is illustrated an embodiment wherein there is created by the remote site 1, two levels of simultaneity for commercial insertions into four networks' breaks. This, for example, would simulate a typical use contemplated for insertion device 70. Device 72 would be a duplicate, but for four other networks.

As shown in Figure 7, four networks; namely, CNN, MTV, ESPN, and A&E are presented for insertion of commercials during a series of three breaks over a finite period of time running from 0 to X. As can be seen in each of these four networks, commercial breaks appear at different times, but both commercial breaks and avails as between the networks may at times overlap. In this embodiment the breaks and networks are chosen so that no more than two network's breaks (and avails) overlap. That is because there are only two levels of simultaneity being generated. The two levels of simultaneity being generated are, as illustrated for example in Figure 5, signals 316 and 318.

Figure 7 contemplates the servicing (insertion) of four DMA's or zones labeled A, B, C, D, respectively. The arrows entering the blocks A, B, C, D indicate insertions of a commercial selected from a plurality of commercials in the indicated tape deck 310a-h. The designation "NP" designates network programming occurring between breaks. Using, for example, the contrast between A&E and ESPN (i.e. signals 56 and 54, respectively) it can be seen that the first break occurs at A&E. That break, usually one minute in duration, is separated into two, equal 30-second "avails". Into the first avail there is inserted in area A (e.g. Atlanta) the first level of simultaneity signal 316 which has selected from tape deck 310a a specific commercial for insertion. Overlapping this A&E break is the first ESPN break which again is separated into two "avails". Despite the fact that a commercial is running in area A on A&E from tape deck 310a via signal 316, the system creates, through simultaneity in signal 318, the selection of another commercial from tape deck 310c for play into area A on the ESPN network. Then, when the first "avail" is finished in area A on the A&E network, tape deck 310a is freed and tape deck 310b is cycled into signal 316 to play the same or a different commercial into area B (Boston) on A&E.

The first "avail" on A&E is not being used in areas B (Boston), C (Chicago), and D (Dallas), while being used in area A. These other areas are then freed up at their headends to insert their own local commercials at that time in the first "avail" on A&E, or to allow the A&E network to run its national advertising being sent by way of its signal 56.

By simply following the diagram presented in Figure 7 in its logical sequencing, and in accordance with the way just described with respect to the contrast between A&E and ESPN, as well as the sequencing of areas A, B, C, and D, it can be seen that four commercial networks are efficiently serviced during their breaks by two levels of simultaneity with a large number of available commercials recorded on eight tape decks, each tape deck capable of storing more than 100, 30-second commercials.

Figure 8 illustrates a similar situation, but in the instance reflected in the system shown in Figure 6, where four levels of simultaneity via signals 316, 317, 318, and 319 are built into the system. Here, eight networks are serviced during their breaks and four network overlaps in their breaks and/or avails may be accommodated due to the four levels of simultaneity built into the system. In this instance, as aforesaid, instead of using the eight tape decks as presented in Figure 5, sixteen tape decks are now employed to give even more opportunity for selecting among an even larger number of recorded commercials. In this respect, it is to be noted that the commercials are conveniently stored in a single system at the remote central site 1, rather than having to store them at each headend site as in certain former prior art systems. The elimination of storage facilities (other than any storage facility desired by the local headend to store its own local commercials) is a significant advantage of this system over certain known prior art devices. By following through, in this respect, the same logical progression of breaks and avails as described with respect to Figure 7, all as illustrated in Figure 8, the efficient servicing of eight cable network channels can be seen to be achieved.

A comparison of Figure 5 with Figure 6 and Figure 7 with Figure 8 illustrates some important differences between the two embodiments illustrated. First of all, it is to be understood, as aforesaid, that Figure 7 illustrates the commercial inserting being generated only by insertion means 70 in Figure 2. Insertion means 72, as illustrated in the parenthesis, would be generating its own two levels of simultaneity 316' and

318' for insertion into networks 58-64 using elements 78 end 80. Thus, in this respect, the embodiment of Figure 5 does create four levels of simultaneity and services eight networks when duplicated insertion means 72 is taken into eccount (i.e. Fig. 7 is mirrored egain for element 72). However, in this embodiment each level of simultaneity only has eight tape decks to choose commercials from, and then it can only service e grouping of four networks. Thus, as shown in Figure 7, insertion means 70 could service CNN, MTV, ESPN and A&E, while insertion means 72 could service NOST, USA, FAM end TNT. In each of these groupings, only two levels of simultaneity can be tolerated. Thus if in either of these two groupings of four networks, for example, one grouping had more than two overlaps in commercial breaks or avails (in other words requiring more than two levels of simulteneity within e grouping), the embodiment of Figure 5 could not accommodete it even with both Insertion means 70 and 72 operating to their fullest capacity.

In comparison it can be seen that the embodiment of Figure 6 (and Figure 8) overcomes this limitation because ell eight networks ere grouped together and are being serviced in the same switching mechanism which creates, instead of two pairs of signals each with two levels of simultaneity, four non-paired signals with four levels of simultaneity. The result is that the grouping of networks now becomes statisticelly more efficient since four overlaps can be accommodated, rather than only two. In addition, all four levels eppropriate control, select from all sixteen tape decks, rather than being limited to only eight tape decks. Thus a degree of flexibility is built in to the embodiment of Figure 6 that is not present in the embodiment of Figure 5. However, in both embodiments a significant improvement over the prior art is achieved. This is particularly true when compression systems ere employed as aforesaid to conserve transponder channel use and thus create further efficiency.

Claims

1. A system for inserting addressed, edditional television signels into network television signals emanating from a source and being received by at least two receiver systems which include switch means responsive to en address signal associated with the additional television signals for allowing the eddressed additionel television signals to be inserted Into the network television signals, the source of the network television signals being located separale from the receiver systems, the system comprising e source of the additional television signals located separate from both the source of the network television signals and the receiver systems, wherein the source of edditionel television signals comprises:
   a) means for sensing a cue signal associated with the television signals, the cue signal designating an upcoming time interval within which a said additional television signal from the source thereof may be inserted;
   b) means for genereting one or more additional television signals capable of being inserted into the time interval after the sensing means senses the cue signal associeted with the time interval;
   c) meens for associeting with each said additional television signal to be inserted a selective address signal such that each said additional signal may be addressed to activate for insertion the switch means in one or more of the receiver systems, and,
   d) means responsive to the cue signel for sending at least one of said additional television signals end the selective address signal associated therewith so that when received at the receiver systems, the address signal will activate for insertion of said edditionel television signal the switch means in at least one, but not all, of the receiver systems.

2. A system as claimed in Claim 1, wherein the sending means includes meens for sequentially sending a said edditional television signel, each sequential sending having essociated therewith a different selective address signal.

3. A system as claimed in Claim 2, wherein the sending means includes means for sending at least two edditlonal television signals eech associated with e different eddress signal in sequence during the same time intervel.

4. A system as claimed in Claim 3, wherein the sensing meens includes means for sensing e cue signal associated with e network television signel from et leest two separate network sources being received by the receiver systems, each said cue signal designating an upcoming time interval associated with its respective network television signal within which a seid additionel television signal may be Inserted from the source of edditional television signals and wherein the sending means includes meens responsive to a said cue signal essociated with at least two network television signals for sequentially sending in response to both the cue signels seld edditional television signals to the receiver systems, each sending having associated therewith a different address signal from the previous sending.

5. A system as cleimed in Cleim 4, wherein the time intervals of the at least two network television

signels overlap in time.

6. A system as claimed in either Claim 4 or Claim 5, wherein the time intervals are commercial breaks.

7. A system as claimed in Cleim 6 wherein the commercial breaks of the al least two network television signals occur simultaneously.

8. A system according to either Claim 6 or Claim 7, wherein the edditional television signels to be inserted are television commerclals, the system further including a storage means containing a plurality of commerclels and control meens for selecting from the storage means commercials for addressing and sending to the receiver systems.

9. A system as claimed in any one of Claims 4 to 8, wherein the means responsive to cue signals includes means responsive to a cue signal associeted with each of at least four television network signals.

10. A system as claimed In any preceding Claim, wherein the source of additional television signals further Includes means for compressing said edditional television signals, end the receiver system includes means for decompressIng a compressed signal received for insertion from the source of edditional television signals.

11. A system as claimed in Claim 10, wherein the decompression meens is further capeble of decompressing a compressed signal received from another source and wherein the receiver system further includes storage means for storing at least one compressed signal after decompression end control meens for removing from the storage means the stored, decompressed signal received from the other source end Inserting the stored signal into the tlme Interval at a tlme not used by the Insertion of a said edditional television signal received from the source thereof.

12. A system as clalmed in any preceding Claim, wherein the source of additional television signals further Includes satellite dish means for receiving a plurality of network progrems which include e cue signal, end uplink means for genereting en uplink signel vie satellite of seid edditional signal to be inserted and sald selective address signal and wherein the recelver system Includes satellite dish means for receiving at least the same plurality of network programs which includes the cue signal as received by the source dish means and for receiving a downlink signal of said edditionel signal to be inserted end said selective address signal from a satellite generated in response to the uplink signal from the source.

13. A method for inserting addressed, additional television signals into network television signals emanating from a source end being received by at least two receiver systems which include switch means responsive to an address signal associated with the additional television signals for allowing the addressed edditional television signels to be inserted into the network television, the source of network television signals being located separate from the receiver systems, the method being initiated from a source of the additional television signels located separate from both the source of network television signals and the receiver systems, end wherein the steps cerried out by the source of the additional television signals comprise:

a) sensing a cue signal associated with the network television signals, the cue signal designating an upcoming time intervel within which a said additional television signal from the source of additional television signels may be inserted;

b) generating one or more additional television signals capable of being inserted into the time interval after said sensing of the cue signal associated with the tlme interval;

c) associating with each said edditional television signal to be inserted a selective address signal such that each said additionel television signal is eddressed to activate for insertion the switch meens in one or more of the receiver systems; and,

d) sending in response to the cue signal at least one said additional television signal and the selective address signal associeted therewith so thet when received et the receiver systems the address signal will actlvete for insertion of said additionel television signal the swltch means in et least one, but not all of the receiver systems.

14. A method es claimed in Cleim 13 which includes the further steps conducted by the receiver systems:

a) receiving a network television signal;

b) receiving said additional television signal and the selective address signal associated therewith;

c) activatlng the switch means in each respective receiver system associated for activation by the address slgnal, and not activeting the switch means in each respective receiver system nol essociated for ectivetion by the selective address signal; and

d) inserting seid edditional television signel within the time interval in the network television signal only at those receiver systems whose switches were activated by the selective eddress signal.

15. A method as cleimed in Claim 14, wherein the time interval is a commercial break and said additional addressed signals for insertion are commercials, wherein said one or more edditional television signals each do not consume more time than the time intervel, end, wherein seid one or more additional television signals are sequentially sent within the time Interval, each additional signal being eccompanied by a different selective address signal so as to ectivate a different switch or group of switches from the other additional signel preceding it in the sequence.

16. A method as claimed in either Claim 14 or Claim 15, wherein the sensing step indudes sensing a cue signal associated with a network television signel from et leest two separate sources being received by the receiver systems, each cue signal designating an upcoming time intervel associated with its respective network television signal within which a said edditional television may be inserted from the source of edditional television signels, wherein the generating step includes generating a plurality of said eddressed edditional signals each of which consumes less time than the time interval into which it is to be inserted, and wherein the method further indudes:

selecting from said plurality of additional signels et least two different edditionel signals, each accompanied by a different selective address signal to be sequentially Inserted into a time interval of at least two networks;

sequentially sending in response to a cue signel from eech of at leest two network signals for insertion into the time interval of each of the at least two network signals sald two additionel television slgnals, each accompanied by its respective different selective eddress signal; and

inserting sequentially into eech time intervel of et least two networks seid edditionel signals only et the receiver systems whose switch means is ectivated by sald selective address signal.

17. A method as claimed In Claim 16, wherein the time intervals of the et least two network television sources overlap In tlme.

18. A method es cleimed in Claim 17, wherein the time intervals of the at least two network television sources occur simultaneously.

19. A method es cleimed in either Cleim 17 or Claim 18, wherein there is sensed for insertlon cue signals from at least four different televislon network sources, at least two of the time intervals thereof overlapping in time.

20. A method as daimed in any one of Claims 13 to 19, wherein the method as carried out at the source of additlonal television signals further Includes, prior to sanding said additional television signals, compressing said additional television signels, and the method es cerried out at the receiver systems which insert said additional television signals, further includes decompressing compressed edditional television signals after receiving said signals for insertion.

21. A method as daimed in Cleim 20, wherein the method carried out et the receiver systems further includes decompressing a further slgnal received from e source other than the source of additional television signals and inserting the further signal into the time interval at e time not used by the Insertion of said additional televlsion signal.

22. A method as claimed in either Claim 20 or Claim 21, wherein the compression and decompression are in a ratio of at leest 4:1 and 1:4, respectively.

23. A method as daimed in any one of Claims 13 to 22, further including monitoring from a central site the sending of signals for insertion and verifying whether or not each signal was sent to its intended receiver system.

24. A method of inserting at least one commercial message from a remote source into at least one pre-cued break in ongoing television network programming being received by et least two receiver systems from et least one network source separate from the remote source and the receiver systems, each receiver system being separate from the other and having therein e switch means for allowing insertion of the commercial message only in response to receipt of en eddress signal preselected to activete that switch means, one, or at least one, switch means being activated only by a different pre-selected address signal than the other switch means, the method including the steps:

e) creating en address signal for ectiveting at least one, but not all, of the switch means at the receiver systems;

b) sensing at the remote source a cue signal generated by the network source for indicating en upcoming breek into which e commercial message may be inserted;

c) sending from the remote source to the receiver systems in response to sensing of the cue signal, a commercial message and a preselected address signal;
d) activating only the switch means in those receiver systems associated with the said preselected address signal; and
e) inserting the commercial message into the pre-cued break only at those receiver systems whose switch means were activated by said pre-selected address signal.

25. A method as claimed in claim 24 wherein the commercial messages consume less than one-half of the precued break, and the method further includes:
a) creating at least two different address signals for activating at least two different switch means;
b) sequentially sending at least twice during the pre-cued break a commercial message from the remote source to the receiver systems; and
c) sending a different address signal in association with each sequential sending of a commercial message from the previous sending of a commercial message;
whereby a commercial message is inserted sequentially at least twice into the commercial break, each sequential insertion occurring at a different receiver system or group of receiver systems from the previous insertion.

26. A method as claimed in Claim 25, wherein the network programming includes programming being sent by at least two network sources to the receiver system, each network source generating a cue signal indicating an upcoming break into which a commercial message may be inserted, and wherein the method further includes
a) sensing at the remote source the cue signals of the at least two networks; and
b) sequentially inserting at least twice into each of the at least two networks' break a commercial message, each sequential insertion in a network's break occurring at a different receiver system or group of receiver systems from the previous insertion.

27. A method as claimed in Claim 26, wherein at least one break of a network overlaps in time with a break of another network, and the sequential insertion of a commercial message occurs in overlapping time relationship during the overlapping breaks.

28. A method as claimed in Claim 27, wherein the overlapping breaks occur simultaneously.

29. A method as claimed in any one of Claims 25 to 28, wherein the sequencing of commercial messages involves at least two different commercials.

30. A method as claimed in any one of Claims 13 to 29, wherein the receiver systems are geographically separated headend systems.

31. A method as claimed in Claim 30 when dependent on any one of Claims 24 to 29 wherein the headend systems are cable television systems, each of which transmits to a plurality of subscribers the television network programming.

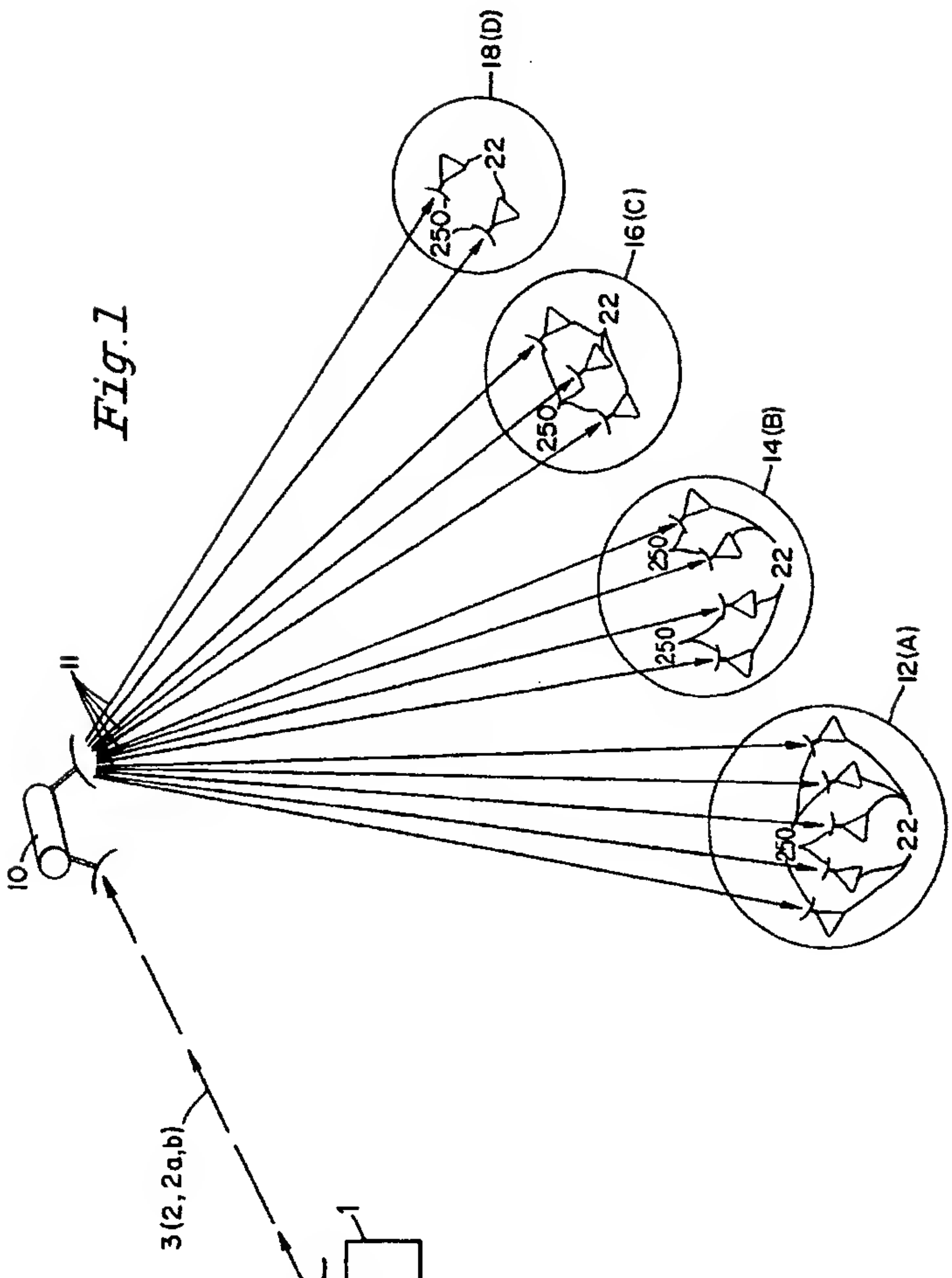


Fig.1

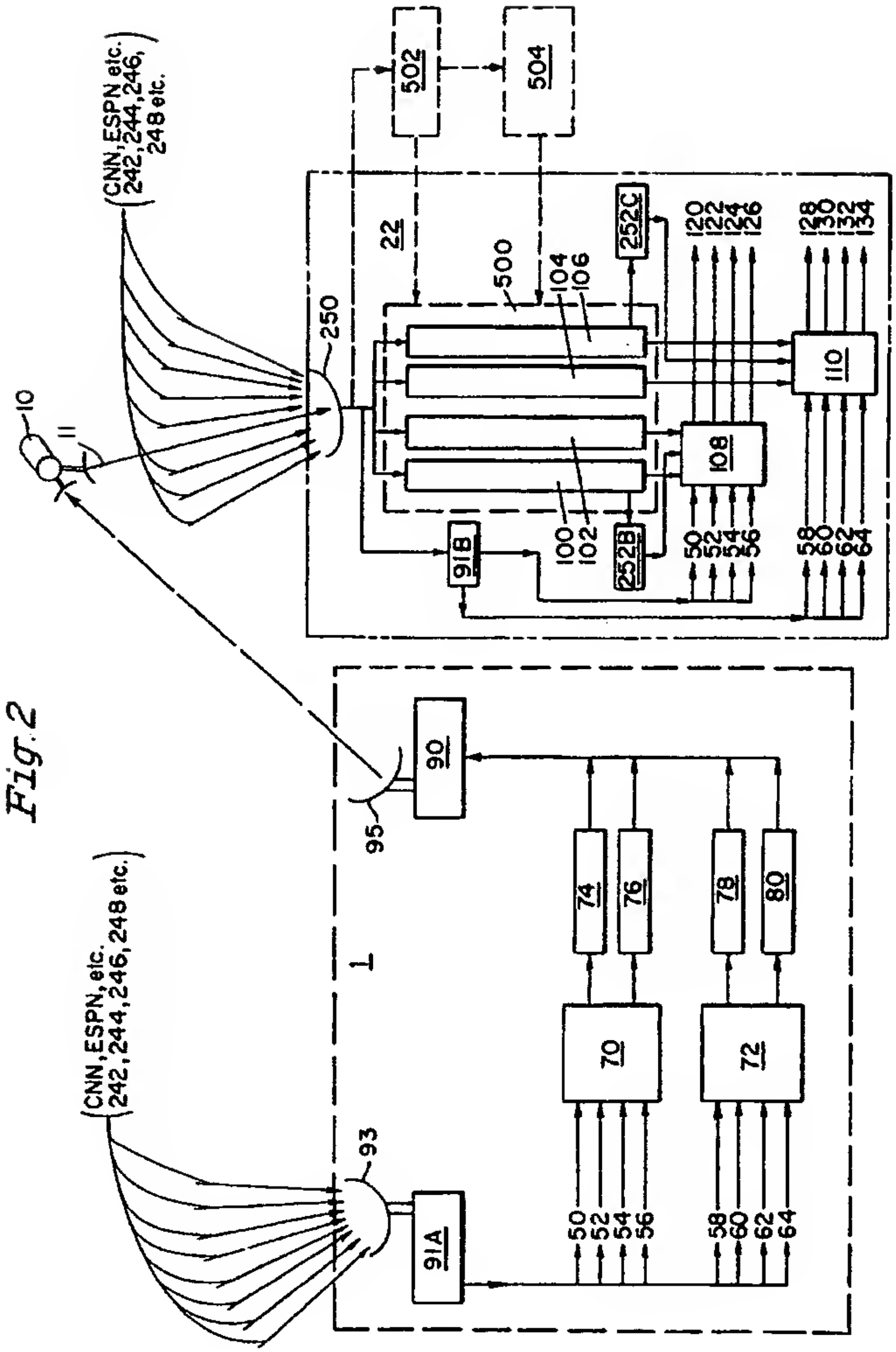
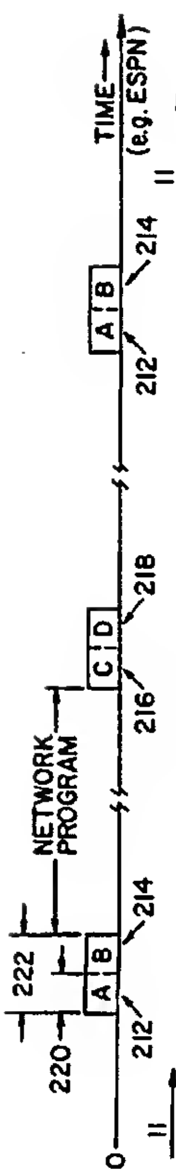
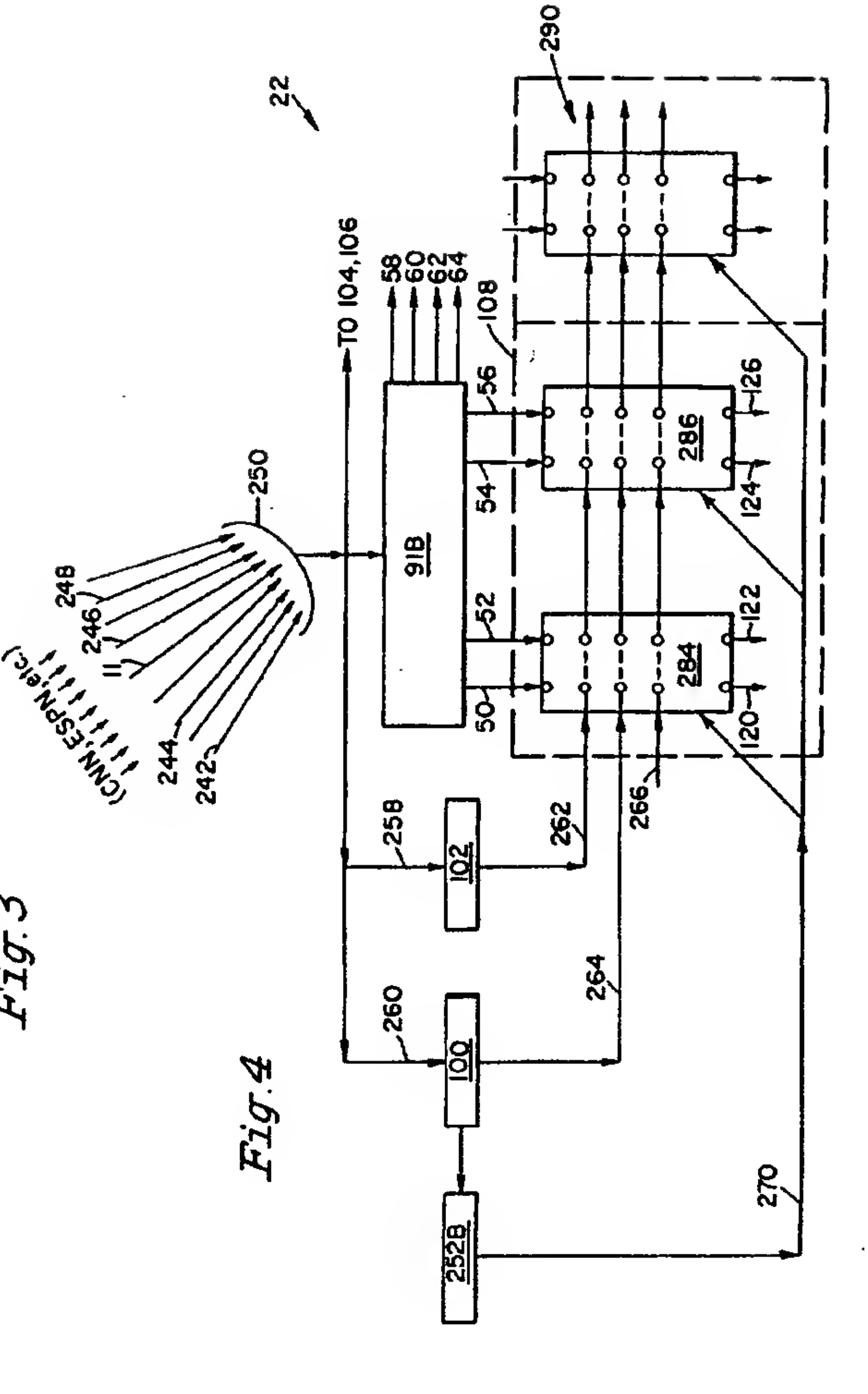

CNN, ESPN, etc.
242, 244, 246, 248 etc.
CNN, ESPN etc.
242, 244, 246,
248 etc.
10
11
250
22
500
502
504
100
102
104
106
108
110
91B
252B
252C
50
52
54
56
58
60
62
64
120
122
124
126
128
130
132
134
93
95
91A
90
1
70
72
74
76
78
80

Fig. 2



0
220
222
NETWORK PROGRAM
A
B
212
214
C
D
216
218
TIME
(e.g. ESPN)

Fig. 3



22
(CNN, ESPN, etc.)
242
244
246
248
250
TO 104, 106
58
60
62
64
91B
50
52
54
56
108
102
100
252B
258
260
262
264
266
270
284
286
290
120
122
124
126

Fig. 4

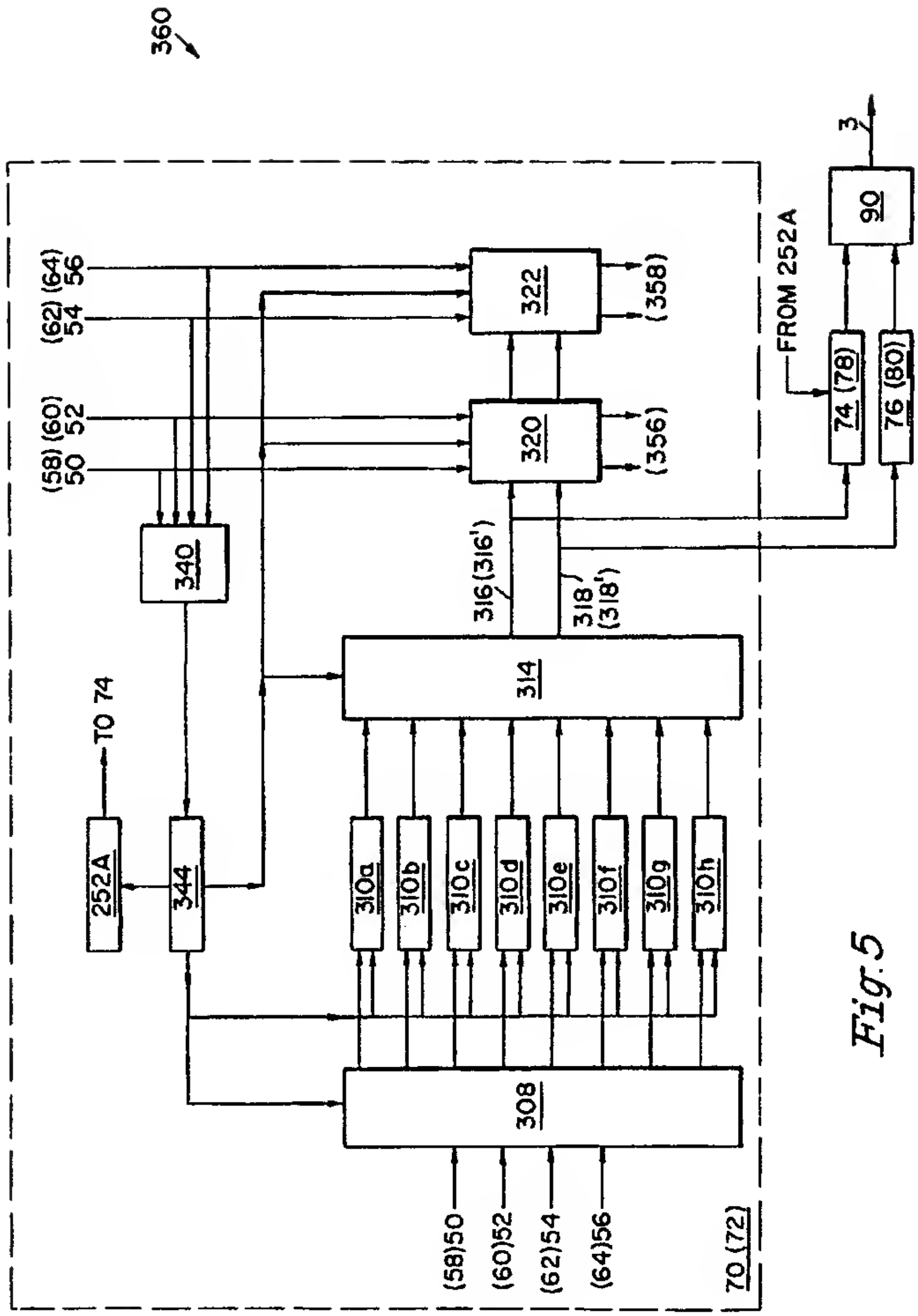
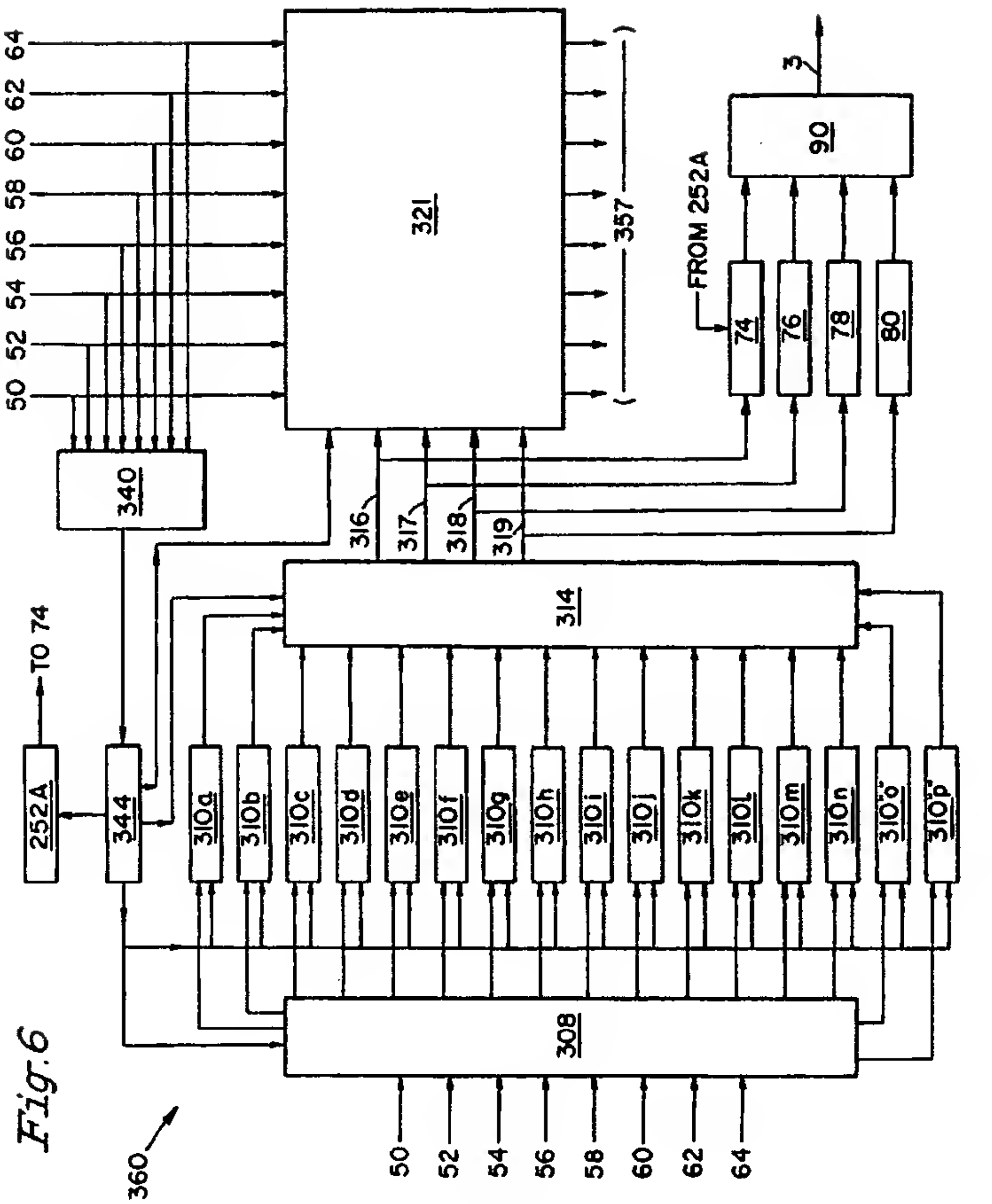

360
70 (72)
(58)50
(60)52
(62)54
(64)56
308
310a
310b
310c
310d
310e
310f
310g
310h
314
316 (316')
318 (318')
320
322
(356)
(358)
(58) (60) 50 52
(62) (64) 54 56
340
344
252A
TO 74
FROM 252A
74 (78)
76 (80)
90
3

Fig.5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52
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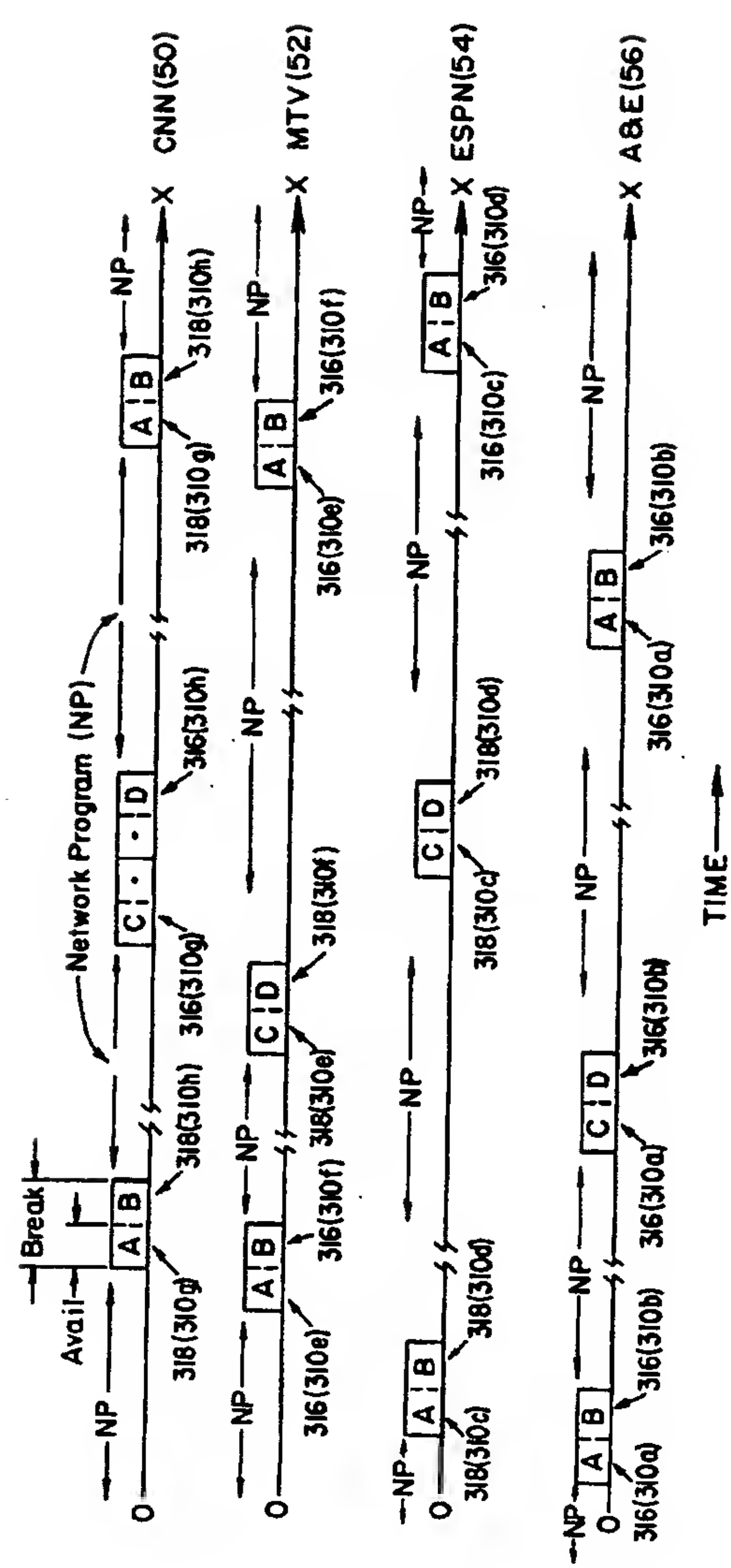
56
58
60
62
64
321
357
340
316
317
318
319
314
90
3
FROM 252A
74
76
78
80
TO 74
252A
344
310a
310b
310c
310d
310e
310f
310g
310h
310i
310j
310k
310L
310m
310n
310"o"
310"p"
308
360

Fig.6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MTV (52)
ESPN (54)
ABE (56)
Network Program (NP)
Avail
Break
NP
A B
C D
318(310g)
318(310h)
316(310g)
316(310h)
316(310e)
316(310f)
318(310e)
318(310f)
318(310c)
318(310d)
316(310c)
316(310d)
316(310a)
316(310b)
X
0
TIME

Fig.7

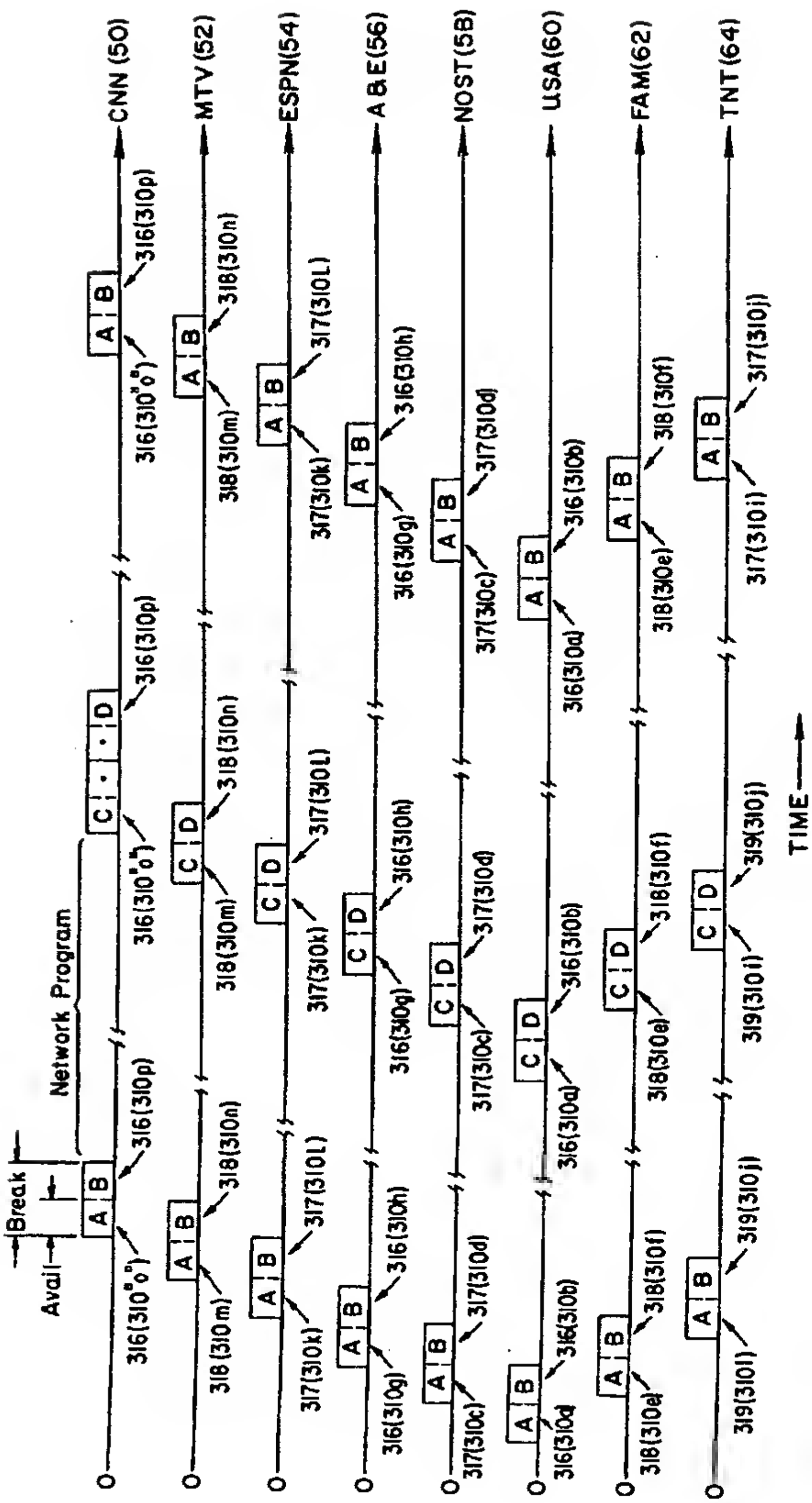
CNN (50)
MTV (52)
ESPN(54)
A&E(56)
NOST(58)
USA(60)
FAM(62)
TNT(64)
Avail
Break
Network Program
TIME

Fig. 8

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 94 30 2686

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
Y A	EP-A-0 536 628 (GENERAL INSTRUMENT CORP.) * the whole document *	1,13,24 2-12, 14-23, 25-31	H04N7/16 H04N7/173 H04N7/20
Y A	US-A-5 200 825 (PERINE) * the whole document *	1,13,24 2-12, 14-23, 25-31	
A	EP-A-0 355 697 (HITACHI) * column 3, line 38 - column 4, line 47 *	1-11, 13-22,24	
A	WO-A-92 21206 (ADEXPRESS COMP.) * the whole document *	1-31	
A	EP-A-0 187 961 (OAK INDUSTRIES INC.) * abstract *	13,24,30	
A	EP-A-0 424 648 (GENERAL INSTRUMENT CORP.) * abstract *	1-31	TECHNICAL FIELDS SEARCHED (Int.Cl.5) H04N

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	3 August 1994	Greve, M

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